# Test deployment of the $4\pi$ instrumentation unit

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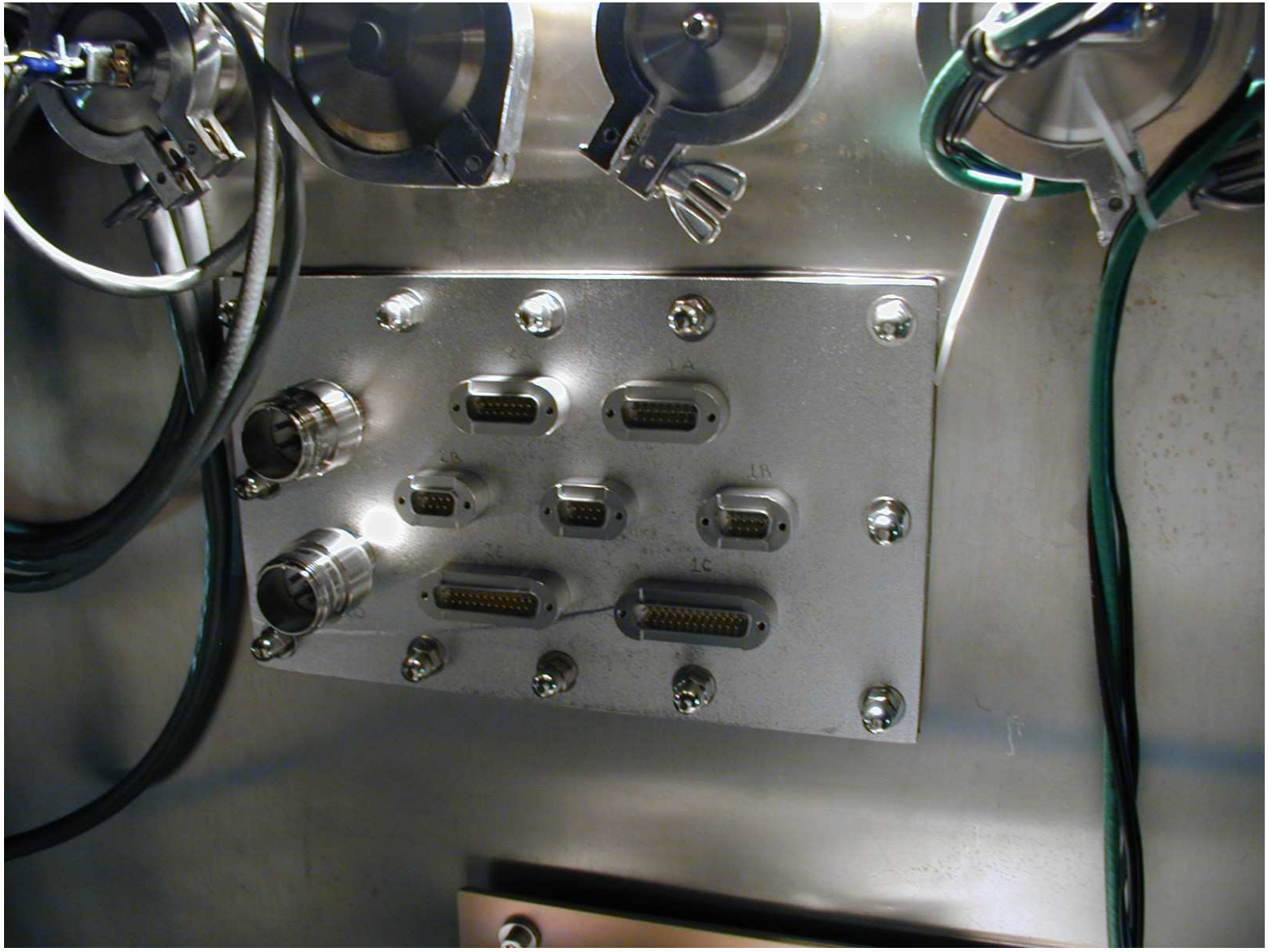
…with many thanks to Kengo!

# *Nose under the (clean) tent*

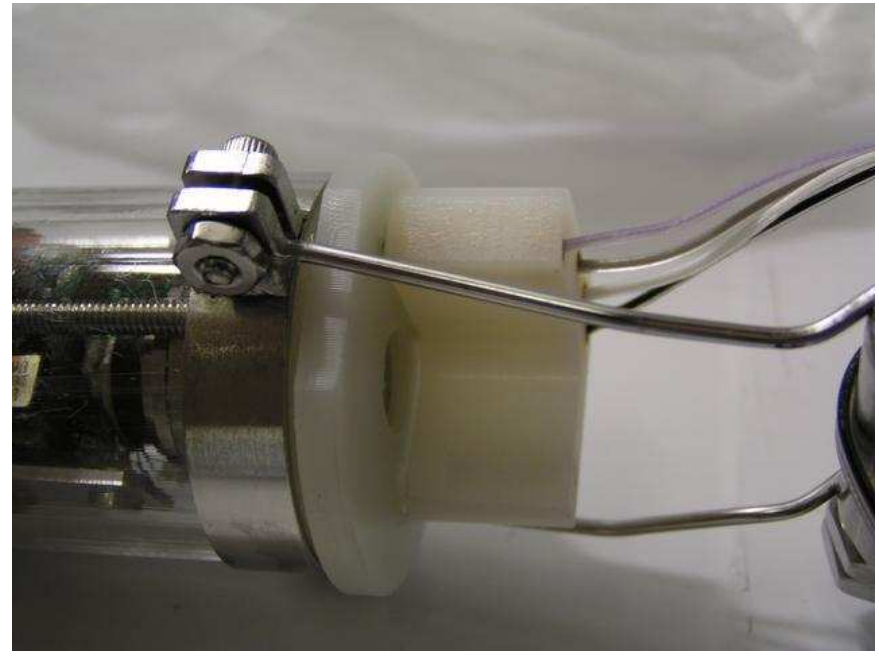


# *Instrumentation unit*

- Pressure sensor
- Thermometer
- Three-axis accelerometer
- Two IR LEDs (830 nm)

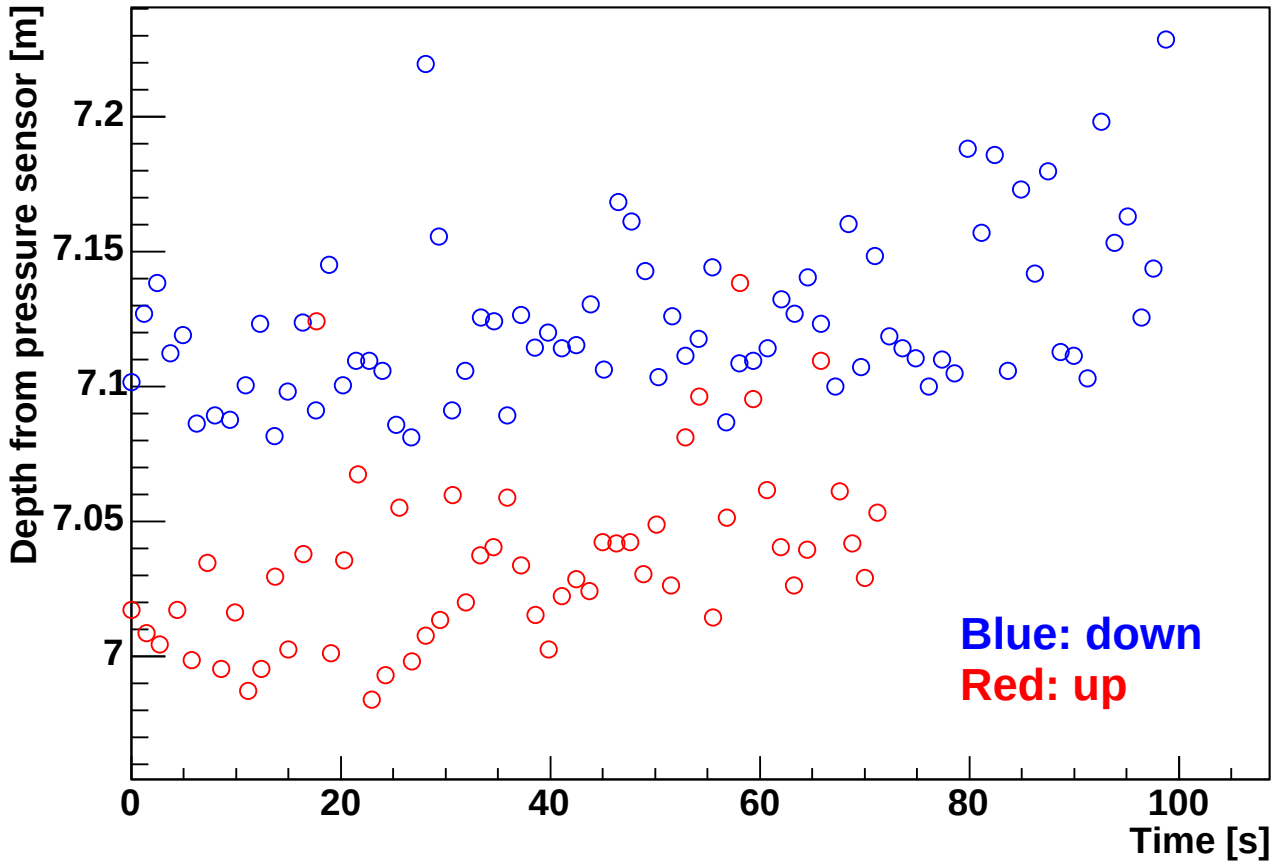
- Deployed to a depth of 18 m below the bottom of the glove-box in 1 m steps

# *Two early lessons*



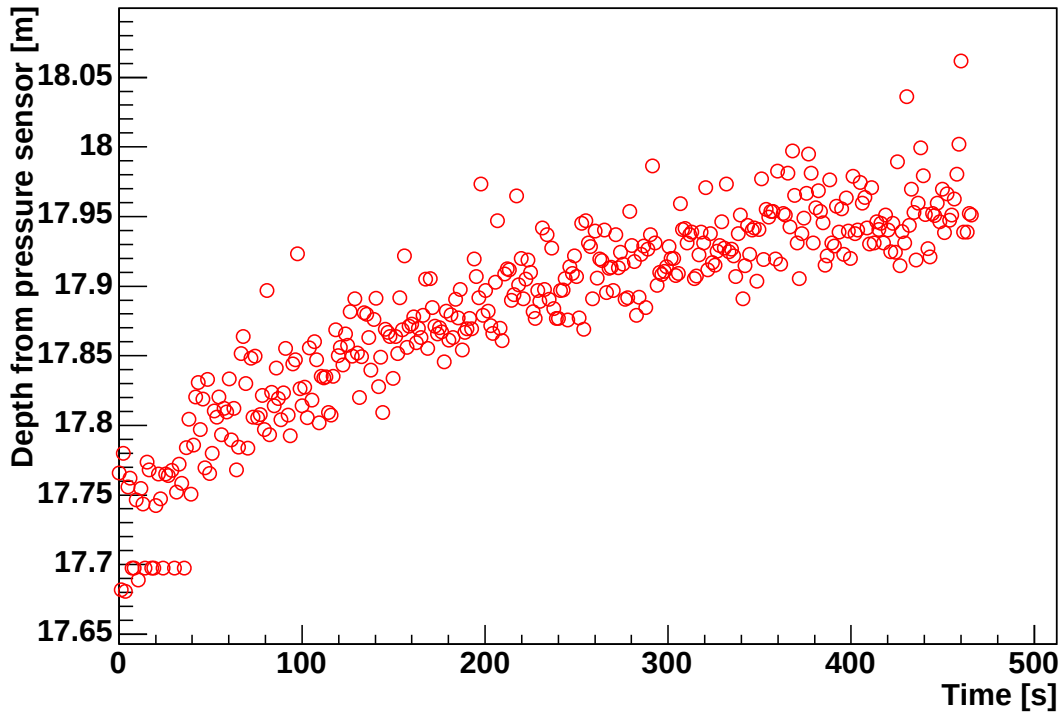
- Pressure test failure (January 2005)
- Connector thumbscrew mismatch

# *Pressure sensor resolution*



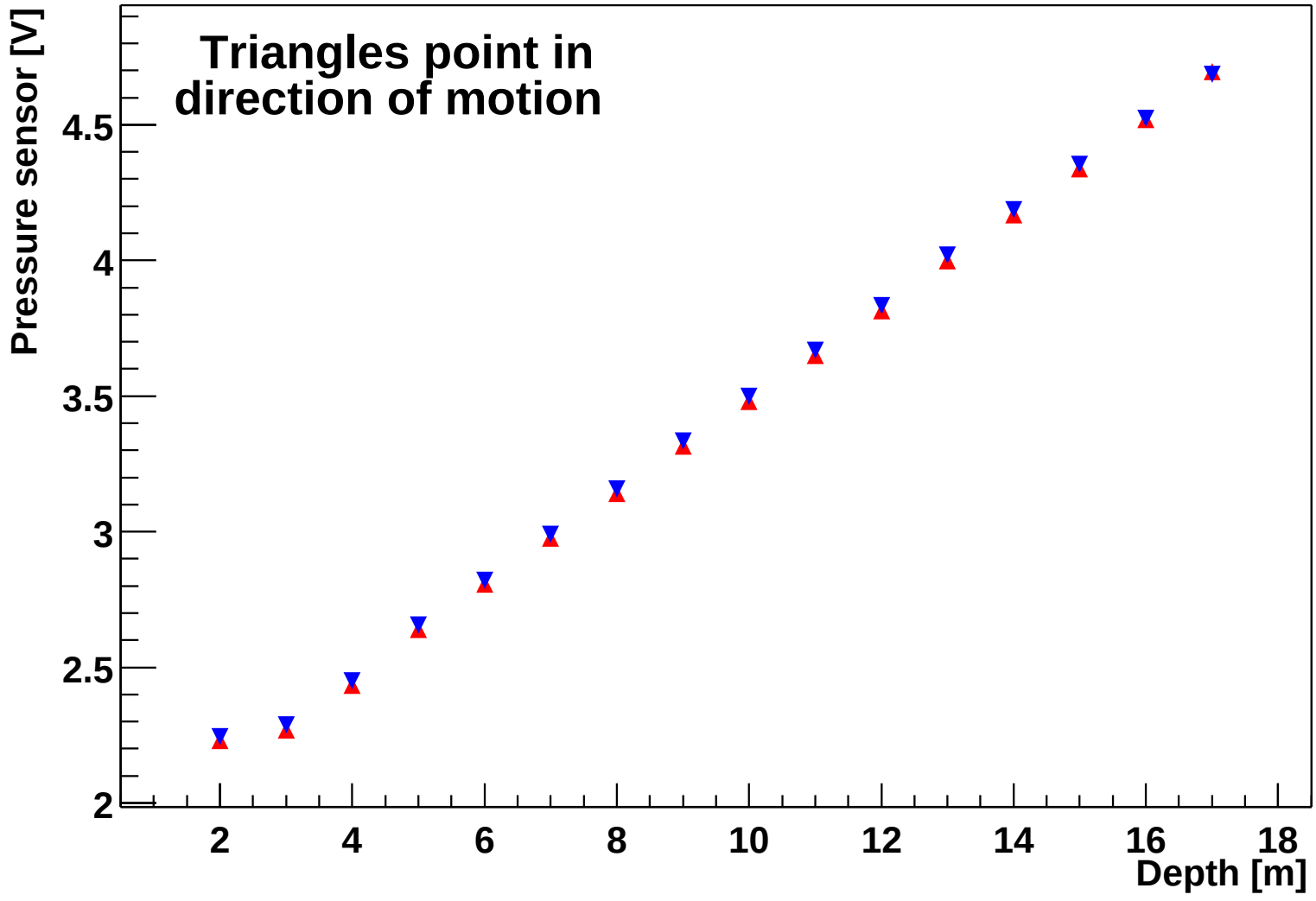

- RMS of single measurement $\simeq$ 4 cm
- 1 measurement per second; 0.5 cm in one minute

# *Pressure fluctuations from glovebox*

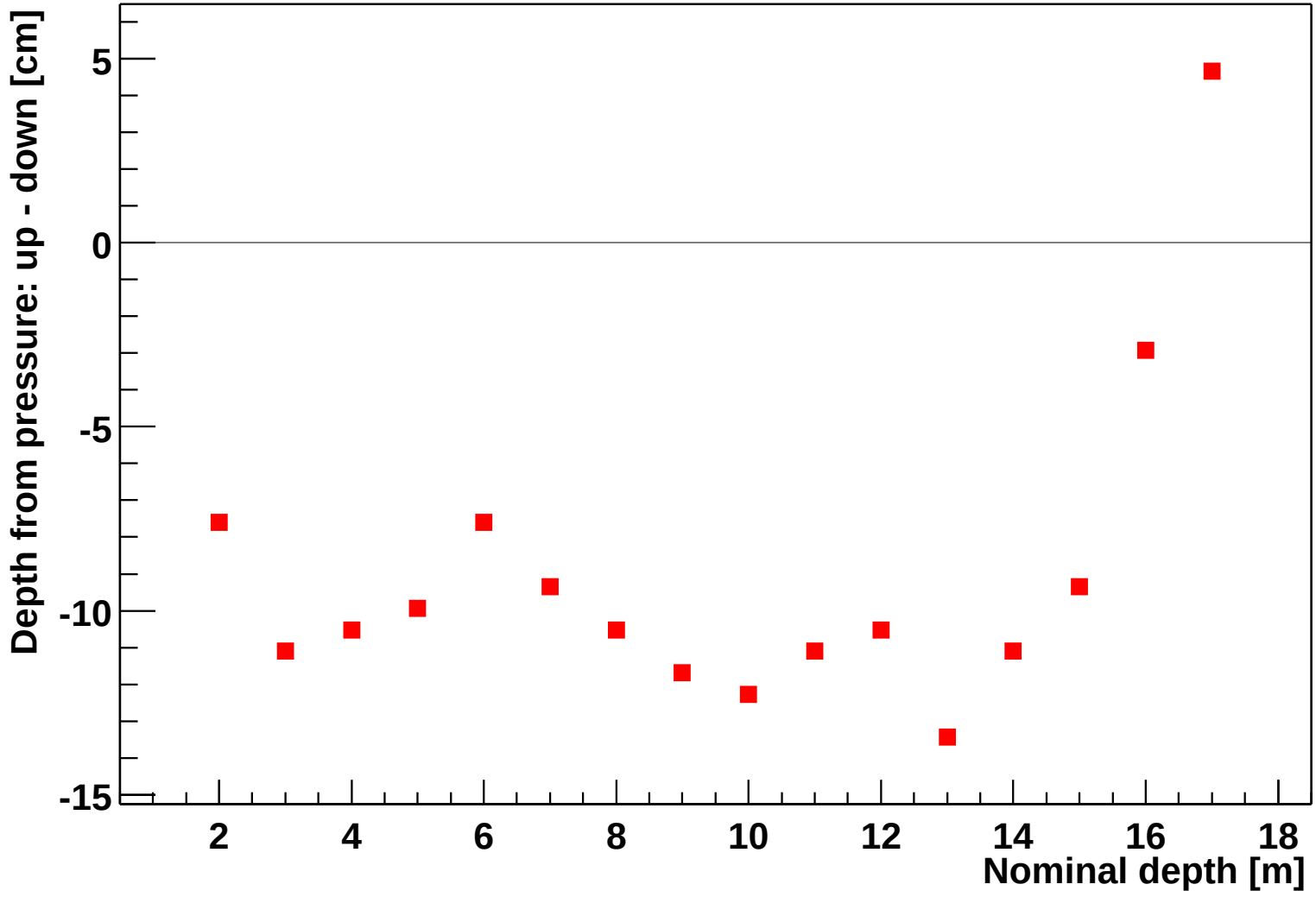



- Instantaneous “spike” followed by slow recovery to atmospheric pressure through glovebox leak.
- Need reference pressure sensor in glovebox.

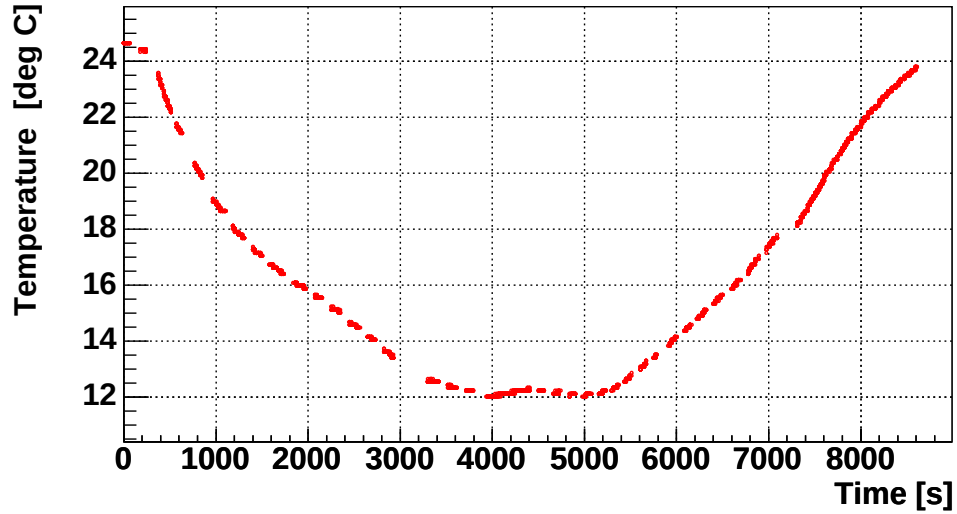
# *Pressure: down vs. up*

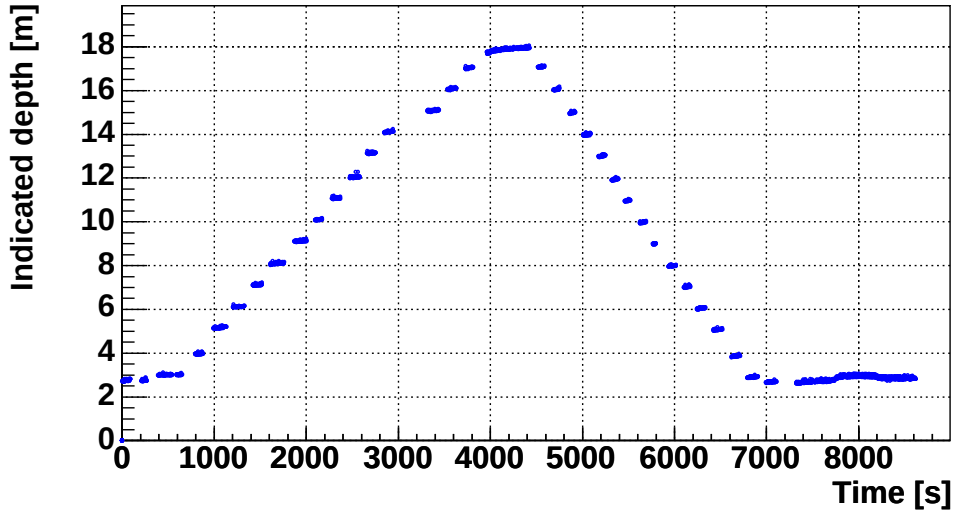


# *Difference in pressure: down vs. up*

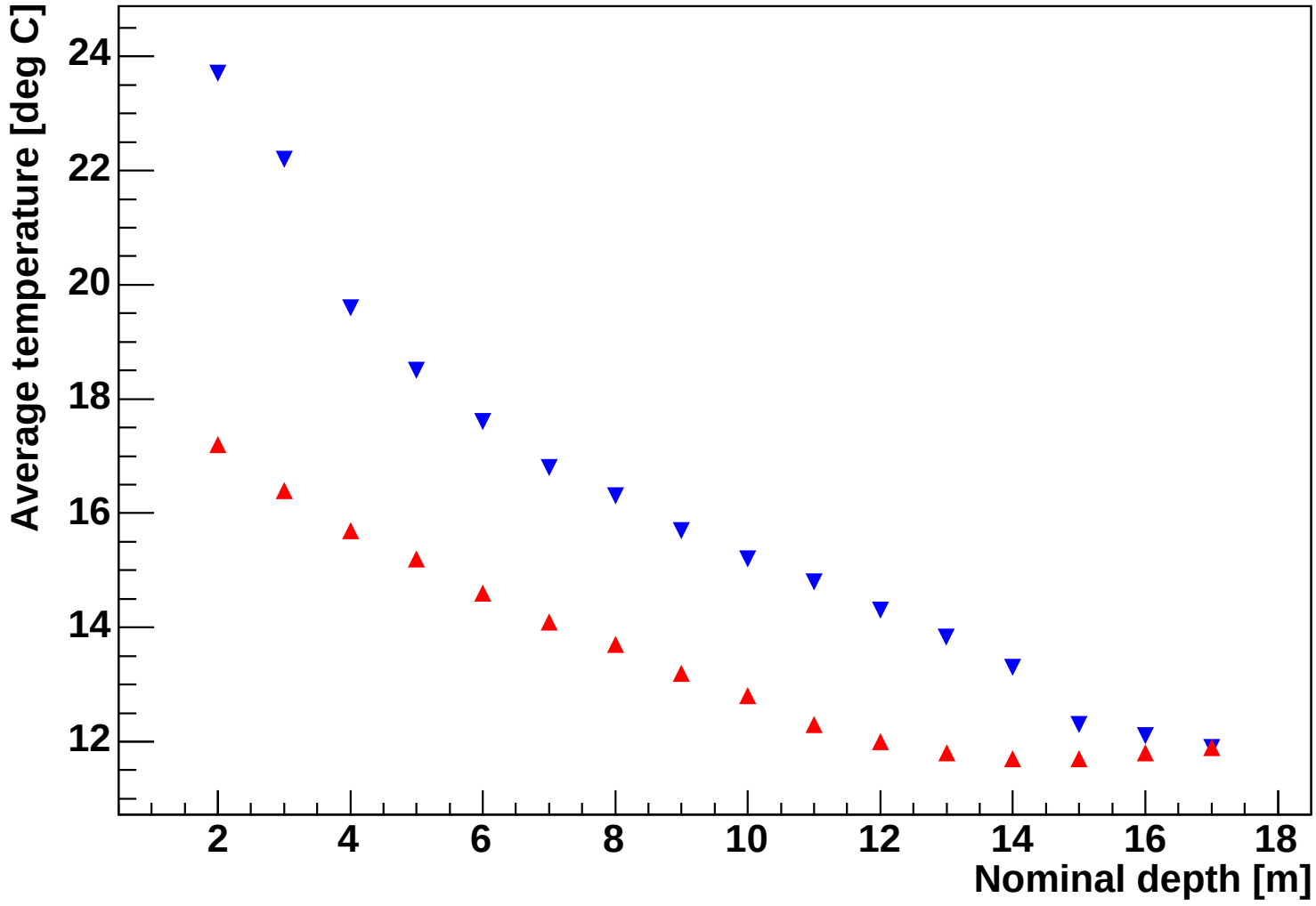


# *Temperature profile*

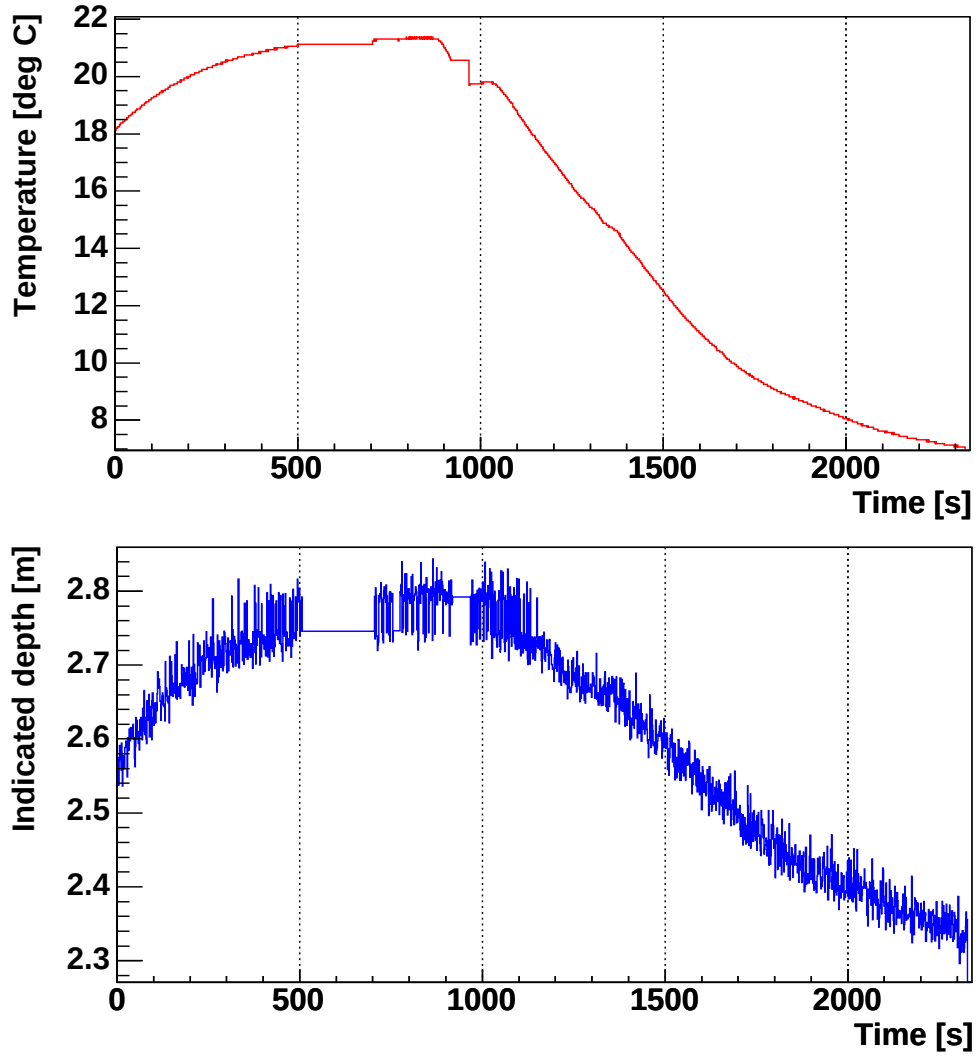


# *Mean temperature vs. depth*



# *Pressure vs. temperature in ice $H_2O$*



# *Conclusion*

By preparing for and carrying out this test deployment, we learned a number of lessons:

- Lucite enclosure made pressure-tight
- Problem with connector thumbscrew fixed
- Need for reference sensor in glovebox established
- Need for temperature correction established
- ...and, we found that the instrumentation unit basically works!

Again, these results would not have been possible without Kengo's help.